Notice of Allowability	Application No.	Applicant(s)	
	10/692,692	POLK, MATTHEW S.	
	Examiner	Art Unit	
	Con P. Tran	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *10-27-2003*.

2. ☒ The allowed claim(s) is/are *1-59*.

3. ☒ The drawings filed on *27 October 2003* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./~~Mail~~ Date 08/18/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 7.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

XU MEI
PRIMARY EXAMINER

EXAMINER'S AMENDMENT

1. Authorization for the examiner's amendment below was given in a telephone interview with the applicant's representative, Mr. Albert L. Ferro, on September 1, 2004.

2. **In the claims** of the Application:

Claim 1, line 4, after "speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 1, line 12, after "sub-speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 1, line 13, after "wherein the", "intended" has been deleted;

Claim 1, line 14, after "locations", "are intended to" has been deleted;

Claim 2, line 2, after "speaker", -- intended to be located --has been replaced by – locates --;

Claim 25, line 4, after "speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 25, line 11, after "speaker", -- intended to be located --has been replaced by – locates --;

Claim 25, line 15, after "sub-speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 25, line 17, after "locations", "are intended to" has been deleted;

Claim 31, line 3, after "speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 31, line 9, after "sub-speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 31, line 11, after "locations", "are intended to" has been deleted;

Claim 32, line 11, after "speaker", -- intended to be located --has been replaced by – locates --;

Claim 55, line 3, after "speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 55, line 7, after "speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 55, line 9, after "sub-speaker", -- intended to be disposed --has been replaced by – disposes --;

Claim 55, line 10, after "wherein the", "intended" has been deleted;

Claim 55, line 11, after "locations", "are intended to" has been deleted;

Allowable Subject Matter

3. **Claims 1-59** are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding independent **claim 1** the cited prior art fails to teach or suggest:

An audio reproduction system comprising:

a first audio input signal, a second audio input signal, a third audio input signal, and a fourth audio input signal; a left main speaker and a right main speaker disposes respectively at left and right main speaker locations spaced along a speaker axis defined as a line passing through said left and right main speaker locations, with a listening area comprising the general area in front of the left and right main speaker locations such that the left main speaker location lies to the left and the right main speaker location lies to the right when viewed from the listening area, wherein said left and right main speakers reproduce sound associated with signals received by said left and right main speakers;

a left sub-speaker and a right sub-speaker disposes respectively at left and right sub-speaker locations, wherein the left and right sub-speaker locations lie approximately on the speaker axis such that the left and right sub-speaker locations as viewed from the listening area are located to the left and right respectively of the respective left and right main speaker locations and are spaced a distance d from the respective left and right main speaker locations such that the distance d is in the range from approximately 50% to 150% of the average spacing between a person's ears as measured in a straight line through the head, wherein said left and right sub-speakers reproduce sound associate with signals received by them; and signal modification and combination means, wherein said signal modification and combination means comprises,

means for modifying and combining the first audio input signal with the second audio input signal and transmitting the combination of said modified first audio input signal and said second audio input signal to said left main speaker, means for modifying and combining the fourth audio input signal with the third audio input signal and transmitting the combination of said modified fourth audio input signal and said third audio input signal to said right main speaker,

means for subtracting said modified fourth audio input signal from said modified first audio input signal and transmitting the resulting difference signal to said left sub-speaker, and means for subtracting said modified first audio input signal from said modified fourth audio input signal and transmitting the resulting difference signal to said right sub-speaker,

wherein sound reproduced by the system that is associated with said second and third audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a range of sound locations approximately between said left and right main speakers, and

wherein sound reproduced by the system that is associated with said first and fourth audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a broad range of sound locations extending beyond the locations of said left and right sub- speakers.

Regarding independent **claim 25** the cited prior art fails to teach or suggest:

An audio reproduction system comprising:

a first audio input signal, a second audio input signal, a third audio input signal, and a fourth audio input signal; a left main speaker and a right main speaker disposes respectively at left and right main speaker locations spaced along a speaker axis defined as a line passing through said left and right main speaker locations, with a listening area comprising the general area in front of the left and right main speaker locations such that the left main speaker location lies to the left and the right main speaker location lies to the right when viewed from the listening area, wherein said left and right main speakers reproduce sound associated with signals received by them;

a left front speaker and a right front speaker locates respectively at left and right front speaker locations generally in front of a listener in the listening area, wherein said left and right front speakers reproduce sound associated with signals received by them;

a left sub-speaker and a right sub-speaker disposes respectively at left and right sub-speaker locations, wherein the left and right sub-speaker locations lie approximately on the speaker axis such that the left and right sub-speaker locations as viewed from the listening area are located to the left and right respectively of the respective left and right main speaker locations and are spaced a distance d from the respective left and right main speaker locations such that the distance d is in the range from approximately 50% to 150% of the average spacing between a person's ears as measured in a straight line through the head, wherein said left and right sub-speakers reproduce sound associated with signals received by them; and signal modification and combination means, wherein said signal modification and combination means comprises,

means for transmitting the second audio input signal to the left front speaker and the third audio input signal to the right front speaker; means for modifying the first audio input signal and transmitting the modified first audio input signal to said left main speaker, means for modifying fourth audio input signal and transmitting the modified fourth audio input signal to said right main speaker, means for subtracting the modified fourth audio input signal from the modified first audio input signal and transmitting the resulting difference signal to said left sub-speaker, and means for subtracting the modified first audio input signal from the modified fourth audio input signal and transmitting the resulting difference signal to said right sub-speaker, wherein sound reproduced by the system associated with said second and third audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a range of sound locations approximately between said left front speaker and said right front speaker, and

wherein sound reproduced by the system that is associated with said first and fourth audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a broad range of sound locations extending beyond the locations of said left and right sub- speakers.

Regarding independent **claim 31** the cited prior art fails to teach or suggest:

A method for producing phantom surround sound effect from a loudspeaker system located in front of a listener, comprising the steps of:

providing a left main speaker and a right main speaker disposes respectively at left and right main speaker locations spaced along a speaker axis defined as a line passing through said left and right main speaker locations, with a listening area comprising the general area in front of the left and right main speaker locations such that the left main speaker location lies to the left and the right main speaker location lies to the right when viewed from the listening area;

providing a left sub-speaker and a right sub-speaker disposes respectively at left and light sub-speaker locations, wherein the left and right sub-speaker locations lie approximately on the speaker axis such that the left and right sub-speaker locations as viewed from the listening area are located to the left and right respectively of the respective left and right main speaker locations and are spaced a distance d from the respective left and right main speaker locations such that the distance d is in the range from approximately 50% to 150% of the average spacing between a person's ears as measured in a straight line through the head; modifying a first audio input signal and combining the modified first audio input signal with a second audio input signal, transmitting the combination of the modified first audio input signal and the second audio input signal to the left main speaker, and reproducing sound associated with the combination of the modified first audio input signal and the second audio input signal in the left main speaker; modifying a fourth audio input signal and combining the modified fourth audio input signal with a third audio input signal, transmitting the combination of the modified fourth audio input signal and the third audio input signal to the right main speaker, and reproducing the sound associated with the combination of the modified fourth audio input signal and the third audio input signal in the right main speaker; subtracting the modified fourth audio input signal from the modified first audio input signal, transmitting the resulting difference signal to the left sub-speaker, and reproducing sound associated with the difference signal in the left sub-speaker; and

subtracting the modified first audio input signal from the modified fourth audio input signal, transmitting the resulting difference signal to the right sub-speaker, and reproducing sound associated with the difference signal in the right sub-speaker; wherein the reproduced sound associated with the second and third audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a range of sound locations approximately between said left and right main speakers, and wherein the reproduced sound associated with the first and fourth audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a broad range of sound locations extending beyond the locations of said left and right sub-speakers.

Regarding independent **claim 55** the cited prior art fails to teach or suggest:

A method for producing phantom surround sound effect from a loudspeaker system located in front of a listener, comprising the steps of: providing a left main speaker and a right main speaker disposes respectively at left and right main speaker locations spaced along a speaker axis defined as a line passing through said left and right main speaker locations, with a listening area comprising the general area in front of

the left and right main speaker locations such that the left main speaker location lies to the left and the right main speaker location lies to the right when viewed from the listening area;

providing a left front speaker and a right front speaker disposes generally in front of a listener in the listening area; providing a left sub-speaker and a right sub-speaker disposes respectively at left and right sub-speaker locations, wherein the left and right sub-speaker locations lie approximately on the speaker axis such that the left and right sub-speaker locations as viewed from the listening area are located to the left and right respectively of the respective left and right main speaker locations and are spaced a distance d from the respective left and right main speaker locations such that the distance d is in the range from approximately 50% to 150% of the average spacing between a person's ears as measured in a straight line through the head; modifying a first audio input signal, transmitting the modified first audio input signal to the left main speaker, and reproducing sound associated with the modified first audio input signal in the left main speaker', modifying a fourth audio input signal, transmitting the modified fourth audio input signal to the right main speaker, and reproducing the sound associated with the modified fourth audio input signal in the right main speaker;

transmitting a second audio input signal to the left front speaker and reproducing sound associated with the second audio input signal in the left front speaker;

transmitting a third audio input siral to the right front speaker and reproducing sound associated with the third audio input signal in the right front speaker; subtracting the modified fourth audio input signal from the moditied first audio input signal, transmitting the resulting difference signal to the left sub-speaker, and reproducing sotmd associated with the difference signal in the left sub-speaker; and subtracting the moditied first audio input signal from the modified fourth audio input signal, trârîsmitting the resulting difference signal to the right sub-speaker, and reproducing sound associated with the difference signal in the right sub-speaker; wherein the reproduced sound associated with the second and third audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a range of sound locations approximately between the left front speaker and the right front speaker. wherein the reproduced sound associated with the first and fourth audio input signals is perceived by a listener located in the listening area whose head is oriented generally toward the speaker locations to originate from a broad range of sound locations extending beyond the locations of said leû and right sub-speakers.

Conclusion

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Con P. Tran, whose telephone number is (703) 305-2341. The examiner can normally be reached on M - F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Customer Service Office at telephone number (703) 306-0377.

cpt
October 1, 2004

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PRIMARY EXAMINER